State of California

The Resources Agency

Department of Fish and Game

Draft Land Management Plan

For

Big Table Mountain

August, 2004

Big Table Mountain Final Draft Management Plan

Prepared by:

Mary Ann McCrary
Region 4 Botanist
SJV – SSR CDFG
1234 East Shaw Avenue
Fresno, CA 93710
(559) 243-4017 x223

Justine Kokx
Biologist
ESRP
1900 N. Gateway Blvd.
Fresno, CA 93727
(559) 453-1103

Approved by:

_____

Regional Manager Date

TABLE OF CONTENTS

FIGURES

LIST OF TABLES

I INTRODUCTION

A. Purpose of Acquisition

The area known as the Big Table Mountain project was acquired primarily for sensitive habitat and species protection, with interpretation as a secondary objective near Millerton State Recreation Area. The Big Table Mountain project encompasses 1,017.5 acres of basalt mesa, Northern Basalt Flow Vernal Pools, blue oak woodland, volcanic cliffs and talus slopes. Northern Basalt Flow Vernal Pools are relatively uncommon in the San Joaquin Valley. Several vernal pools on Big Table Mountain are known to support populations of Federal and State listed species, including succulent owl's clover (Castilleja campestris var. succulenta), Bogg's lake hedge-hyssop (Gratiola heterosepala), San Joaquin Valley orcutt grass (Orcuttia inaequalis) (on BLM property only), vernal pool fairy shrimp (Branchinecta lynchi) and tadpole shrimp (Lepidurus packardi).

B. Acquisition History

The acquisition of the Big Table Mountain project was undertaken jointly through a cooperative venture by the Wildlife Conservation Board (WCB) and the California State Department of Parks and Recreation (DPR) in 1992. The WCB acted as the lead agency, administering and paying for all litigation guaranties, policies of title insurance, appraisal reports, CEQA compliance, and Department of General Services administrative reviews and processing work. The Wildlife and Natural Areas Conservation Program (Proposition 70, Section 2720) appropriated $887,204.15 to the WCB for the acquisition (CDFG 2001). The Habitat Conservation Fund appropriated $605,000 to the DPR to supplement the WCB funds (CDFG 1992).

The acquired property was divided between the WCB and the DPR, proportional to the amount of funding provided by each agency. The CDFG holds fee title to the 715-acre parcel purchased by the WCB, and the remaining 302.5 acres are owned by the DPR (Figure 1).

C. Memoranda of Understanding

Three Memoranda of Understanding have been established between the DFG and cooperative agencies, which outline mutual policies toward the purchase and management of the Big Table Mountain project. The first Memorandum of Understanding between the DPR and the WCB was signed on May 8, 1992 prior to purchasing the Big Table Mountain project (Appendix A). The MOU established a relationship between the two

agencies to jointly acquire and manage the 1,017.5-acre Big Table Mountain

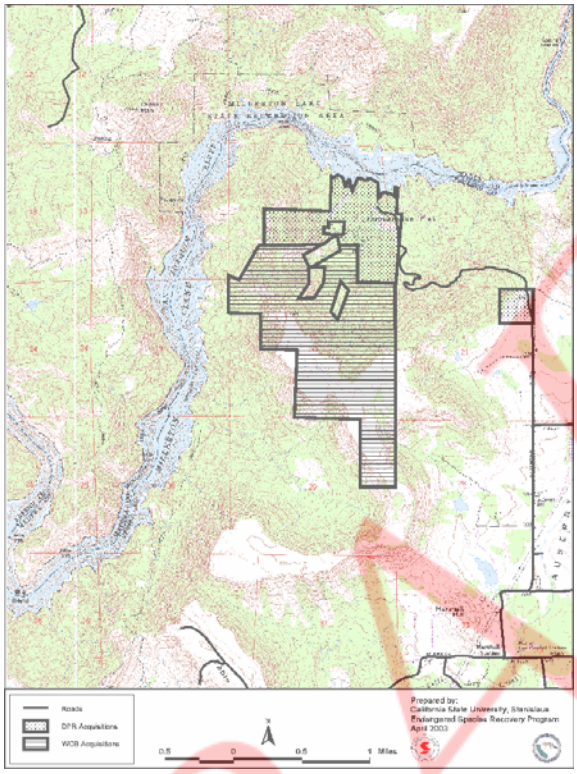

Figure 1. Big Table Mountain Project, WCB,and DPR acquisitions.

project. It defined the roles the respective agencies were to play in the acquisition, as well as delineated the property division between the WCB and the DPR. The MOU designated management and operations responsibilities to the DPR as an extension of Millerton State Park, with the requirement that the DPR and the WCB's assignee cooperate in establishing mutually acceptable management policies for the property. The primary focus of the management was clearly designated to be wildlife and sensitive habitat protection. All other uses were not to conflict with this objective.

On December 14, 1992, the DPR and the DFG executed a second MOU to establish mutually acceptable procedures for long-term management of the 1,017.5-acre Big Table Mountain acquisition (Appendix B). The MOU obligated the DPR to manage and operate the acquired property at no cost to the DFG as an extension of Millerton Lake State Recreation Area. Further emphasis was placed on achieving park, interpretive, viewshed and habitat protection objectives near Millerton Lake State Recreation Area. An additional component of the MOU required the DPR to seek a designation of Natural Preserve through its unit classification procedures for the tabletop as well as volcanic cliffs and the highest 200 feet of talus slope. The Natural Preserve designation functions as a sub-unit of the

larger State Wilderness System. However, both categories are intended to protect the environmental integrity of an area. California State Park System departmental directives limit interpretive facilities within a Natural Preserve to trails and signs. Facilities such as parking areas, restrooms and other structures are not permitted inside a Natural Preserve's boundaries. Finally, the MOU outlined specific management issues that would need to be addressed during the course of managing the Big Table Mountain project. Some of the issues included public use and access, cattle and horse grazing, rare plant and animal species, facility maintenance, and natural resource protection.

A third Memorandum of Understanding was drafted in 2000 between the DPR, CDFG, the U.S. Bureau of Land Management (BLM), the U.S. Bureau of Reclamation (BOR), and the Sierra Foothill Conservancy (SFC) for the cooperative resource management of Big Table Mountain and adjacent properties owned and managed by the respective agencies. The intention of the MOU was to establish a cooperative agreement to manage the collective properties as a unit, referred to as the Big Table Mountain Area, through 2004 (Appendix C). Although the parties involved have yet to sign the MOU, they proceeded with a three-year grazing field trial designed to assess the effects of grazing on Big Table Mountain vernal pool and upland vegetation.

D. Purpose of the Management Plan

Management plans are to be prepared for all DFG properties acquired to protect and manage wildlife habitat, including wildlife areas, ecological reserves, and undesignated lands. Big Table Mountain has not been designated an ecological reserve, and falls under the undesignated lands category. This management plan is intended to provide the necessary information to manage the DFG owned 715-acre parcel of the Big Table Mountain project, henceforth referred to as Big Table Mountain. It is not intended to replace any mutually established management activities currently conducted by the DFG and the DPR on Big Table Mountain. Nor is it intended to address the management of the two parcels totaling 302.5 acres owned by DPR adjacent to Big Table Mountain.

The plan guides the management of habitats, species, and programs described herein to achieve the department's mission to protect and enhance wildlife values.

The plan serves as a descriptive inventory of wildlife and native plant habitats that occur on or use this property, and outlines appropriate public uses of these resources.

The plan provides an overview of the property's operation and maintenance and personnel requirements to implement management

goals. It serves as a budget planning aid for annual regional budget preparation.

The plan provides a description of potential and actual environmental impacts and subsequent mitigation, which may occur during management, and contains environmental documentation to comply with State and Federal statutes and regulations.

II PROPERTY DESCRIPTION

A. Geographical Setting

Big Table Mountain is located in eastern Fresno County, on the Millerton Lake East U.S.G.S. 7.5-minute quadrangle map in Township 10S, Range 22E, and sections 20, 21, and 29 (Figure 2, Table 1). The nearest towns are Friant to the southwest and Auberry to the east. The Big Table Mountain property is situated east of Millerton Lake, 5 miles south of the town of Prather. To access the property, follow Wellbarn road north from Auberry road (Figure 2). Two gates with combination locks limit vehicular access to the property.

Figure 2. Big Table Mountain overview map.

Table 1. Parcels owned by the California Department of Fish and Game

at Big Table Mountain.

APN number	Location
00018-0250-0038	Township 10S, Range 22E, Section 20
00118-0250-0027	Township 10S, Range 22E, Section 20
00118-0250-0028	Township 10S, Range 22E, Section 20
00118-0250-0029	Township 10S, Range 22E, Section 20
00118-0250-0030	Township 10S, Range 22E, Section 20
00118-0250-0031	Township 10S, Range 22E, Section 20
00118-0250-0032	Township 10S, Range 22E, Section 20
00118-0250-0033	Township 10S, Range 22E, Section 20
00118-0250-0034	Township 10S, Range 22E, Section 20
00118-0250-0035	Township 10S, Range 22E, Section 20
00118-0250-0036	Township 10S, Range 22E, Section 20

00118-0250-0039	Township 10S, Range 22E, Section 20
00118-0250-0042	Township 10S, Range22E, Section 17
00118-0250-0043	Township 10S, Range22E, Section 17
00118-0360-0013	Township 10S, Range 22E, Section 29
00118-0360-0014	Township 10S, Range 22E, Section 29

B. Property Boundaries and Adjacent Land Use

1. Adjacent land use

Several organizations, including state, Federal and non-profit agencies, manage foothill lands adjoining or in the vicinity of Big Table Mountain. Similar plant communities, habitats and management issues have prompted the land managers to establish a cooperative land management plan, which is currently under discussion and development. The Sierra Foothill Conservancy (SFC), a private, non-profit organization, manages the 2,940-acre McKenzie Preserve adjacent to the Big Table Mountain property. The McKenzie Preserve adjoins the southern boundary of the Big Table Mountain property and connects it to the McKenzie Table. The McKenzie Preserve protects increasingly rare foothill communities from encroachment and other disturbances. It also functions as a valuable interpretive resource and outdoor laboratory for education and research. The SFC actively employs grazing as a management tool to control non-native forbs and grasses and to promote the re-establishment of native plant communities. The BLM, the BOR, and the DPR also own significant portions of land near or bordering Big Table Mountain (Figure 3). The DPR properties acquired under the initial MOU consist of a 262.5-acre and a 40-acre parcel north and east of the tabletop. The 262.5-acre parcel extends to the banks of Millerton Lake. Bureau of Reclamation land lies to the west of the table, extending to Millerton Lake. A sliver of BLM land lies

to the south of the SFC property. Privately owned land borders the eastern edge of the Big Table Mountain property.

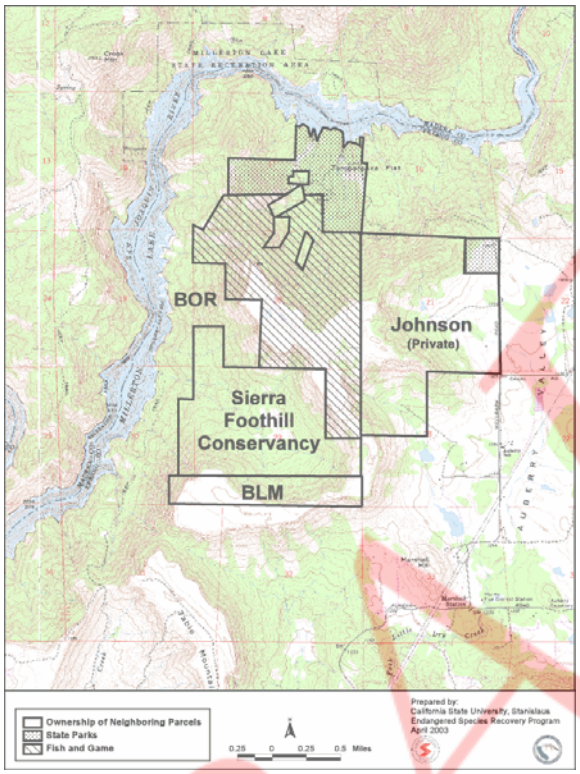

Figure 3. Land use adjacent to Big Table Mountain.

Several mining claims are located adjacent to the Big Table Mountain area. The Keno Consolidated Mining Claim is located in Sections 17 and 20. The Rattlesnake Quartz mining claim is located in Sections 17 and 18 (Appendix A). These claims are north of the north-facing cliff of Big Table Mountain and are adjacent to or are surrounded by DFG property. They are part of the Temperance Flat Mining District, which may contain gold or other precious metals.

C. Geology, Soils, Climate and Hydrology

Big Table Mountain is a basalt mesa, which formed approximately 10 million years ago during the Miocene. Lava flow from a nearby volcano flooded the ancestral San Joaquin riverbed and cooled. Erosion later removed the softer, surrounding soils and left the cooled lava as a complex of "table mountains" (USDA 1971). The exact location of the eruption is unknown, but the thickness of the lava flow suggests that it likely originated from the northeast side of Kennedy Table, 4 miles north of Big Table Mountain. Time and erosion have created a talus apron at the base of the cliffs.(Poole 1997).

Big Table Mountain occupies approximately 715 acres of table top, cliff

and talus slope. Soils on Big Table Mountain primarily consist of extremely stony, shallow soils that were formed in weathered basalt rock. The parent rock consists of basalt columns of cooled lava. Elevations range from 1,940 to 1,980 feet. Big Table Mountain's shallow, rocky soils support annual grasses, forbs and mosses. Deeper soils support various trees and shrubs of the chaparral and woodland communities. Vernal pools form in the low-lying areas, which support high concentrations of native and rare species of plants and animals. Surrounding foothill soils are derived from weathered granitic soils of the Sierra Nevada, and tend to be well drained, supporting woodland, grassland and chaparral vegetation communities (USDA 1971).

Soils of the Big Table Mountain tabletop are primarily composed of extremely stony loam of the Hideaway Series (Figure 4). The Hideaway Series soils are shallow, stony soils weathered from basalt rock. Hideaway Series soils are topographically undulating to rolling, typically well drained, moderately permeable, and with medium runoff. Acidity ranges from medium to strongly acidic. The typical soil surface layer is about 3 inches thick with little risk of erosion. Hideaway soils are low in fertility, but they do support stands of annual grasses and forbs. The underlying rock drains water through vertical cracks, which are visible at the surface. The parent rock has a coarse, columnar structure that drops vertically for one hundred feet or more. The grasslands occurring on Hideaway soils have historically been used for spring grazing. Little fencing is required atop these basalt mesas, as vertical cliffs border much of the area (USDA 1971)

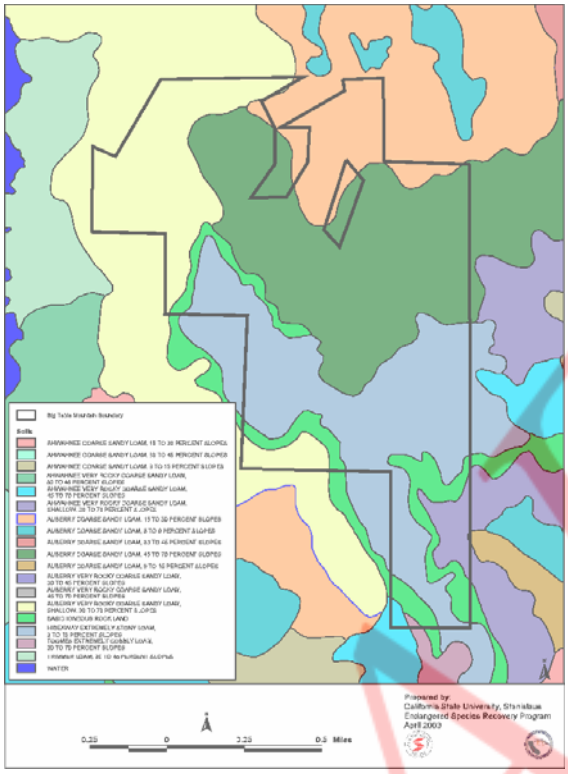

Figure 4. Big Table Mountain soils map.

Areas on Big Table Mountain that are composed of 50 to 90 percent basalt or metamorphic rock are called Basic Igneous Rock land (USDA 1971). The columnar cliffs and basalt outcrops are in this category. Soils are loamy and vary in depth, although they are typically even shallower than the Hideaway soils. Drainage is typically good. These areas support annual grasses, forbs and some perennial, hardwood species (USDA 1971). Observations by DFG personnel and others suggest that these rocky outcrops and associated soils support fewer non-native species than nearby deeper soils of the Hideaway Series.

The soils surrounding the tabletop include the Ahwahnee, Auberry and Toomes series. Ahwahnee Series soils occur along the steep, western slopes of the tabletop (Figure 4). These soils are well drained to excessively well drained, coarse in texture, and moderately deep. The surface soil is a slightly acidic, coarse sandy loam approximately 10 inches thick. Subsoil is a sandy loam of higher acidity and clay content. Below the sublayer to about 36 inches is weathered quartz diorite. Vegetation is similar to that of the Auberry Series soils. Woody species such as blue oak, interior live oak, foothill pine and California buckeye dominate (USDA 1971).

Ahwahnee very rocky coarse sandy loam occupies slopes of 30 to 45 percent and 45 to 70 percent. It is a shallow soil, with an average depth to parent rock of about 20 inches. Rock outcrops and blocks of basalt rocks,

which have tumbled from the nearby cliffs, dot the surface of this soil. The shallowness of the soil reduces its water holding capacity. In addition, runoff is rapid, contributing to its high erosion potential, especially on the steeper slopes (USDA 1971).

Soils of the Auberry Series occur on the steeper slopes surrounding Big Table Mountain (Figure 4). These soils are derived from granitic rocks of the upper foothills. They are moderately coarse in texture, well drained and deep. The 12-inch surface layer is a slightly acidic coarse sandy loam. The underlying subsoil is sandy clay loam of medium acidity. About 42 inches below the subsoil lies deeply weathered parent rock. Vegetation consists primarily of woody species such as blue oak (Quercus douglasii), interior live oak (Quercus wislizenii), California buckeye (Aesculus californica) and foothill pine (Pinus sabiniana) (USDA 1971).

Auberry coarse sandy loam occurs on 45 to 70 percent slopes and on 15 to 30 percent slopes north of the tabletop to the edge of Millerton Lake. This soil is excessively well drained. On the 45 to 70 percent slopes, runoff is rapid, contributing to an erosion hazard during the wet months. Soils on the 15 to 30 percent slopes are less prone to erosion, but medium to rapid runoff creates erosion problems in some areas (USDA 1971).

Auberry very rocky coarse sandy loam is a shallow soil, that occupies slopes of 30 to 70 percent west of the tabletop. Rock outcrops account for 2 to 50 percent of the surface area. The shallowness of the soil reduces the water holding capacity. In addition, runoff is extremely rapid, contributing to a high erosion hazard (USDA 1971).

Soil of the Toomes Series occurs at the southernmost tip of the DFG property on slopes of 30 to 70 percent. This is a shallow, extremely cobbly loam formed by the basaltic material of the lava flows. Toomes Series soil skirts the western edge of the tabletop, merging with gentler slopes and granitic soils below (Figure 4). Typical soil layer is neutral to slightly acidic, approximately 5 inches thick, terminating abruptly in cobblestones embedded in lava flow material. Rapid runoff and low water holding capacity contribute to the formation of eroded gullies. Vegetation consists primarily of annual grasses and forbs, mosses, and a few shrubs such as coffeeberry (Rhamnus tomentella) and bush lupine (Lupinus albifrons) (USDA 1971).

Annual precipitation in the Big Table Mountain vicinity ranges from 17 to 22 inches depending on elevation. Annual temperatures average 57 to 60 degrees

Fahrenheit. Approximately 200 to 225 frost-free days occur annually

(USDA 1971).

D. Cultural Features

1. Archaeology

Big Table Mountain lies within Dumna territory. The Dumna are a northern foothill division of the Yokut tribe, which occupied the entire San Joaquin Valley, including the lower slopes of the Sierra Nevada. The Dumna territory extended from the north side of the San Joaquin River to the mouth of Fine Gold Creek and Bellevue (Kroeber, 1976). In spite of the Dumna tribe's significant presence in the area, no known cultural artifacts exist on Big Table Mountain.

2. Historic land use

Members of the Dumna tribe grazed cattle on and around Big Table Mountain during the 1800's. Grazing continued in the area until the WCB acquisition in 1992. Between the years of 1992 and 2000, cattle were removed from the tabletop as public land managers thought the habitats would benefit from complete rest.

3. Existing structures

A cross designating the site of annual Easter Sunrise celebrations stands at the edge of the northernmost cliff. These services have not been performed since acquisition by the WCB, but the cross remains as a cultural feature.

A portable toilet has been placed at the top of the table, near the staging area. It is maintained as necessary by the DPR.

Electric fencing was erected in January, 2000 to separate the grazed and ungrazed treatments of the grazing study, which requires a 12-volt marine battery to electrify the wires. During winter and spring grazing periods, weekly visits are necessary to maintain the fence. Tall grasses are cut each year before activating the fence to prevent fires.

The DPR has placed two picnic tables on Big Table Mountain for visitor use during interpretive walks. One is located near the staging area, and the other near the north end of the table.

Two gates limit access to Big Table Mountain. The first is located at the end of Wellbarn road. The second is located at the base of a steep four-wheel drive road leading to the tabletop. The steep terrain contributes to an erosion problem during the wet months. The DPR maintains the road

as necessary to allow access to the tabletop. A 4-wheel track leading from the parking area to the northern edge of the table remains in fair condition.

4. Current land use

Grazing Field Trial and Monitoring:

Grazing was resumed in 2000 on the experimental portion (approximately half) of the tabletop as part of a grazing field trial, which continued through 2002 without significant alterations to the original monitoring plan (Appendix F). In 2003 and 2004 there was no grazing on either treatment area on the table top. However, monitoring continued using the same methods as were employed for the 2000-2002 field trial and some additional methods were tested. However, sample sizes were reduced and the number of sampled areas were increased. These changes were made in response to reduced staffing and a need to establish a broader sampling of habitats in preparation for implementing the Grazing Plan (Appendix G). Region 4 botany staff is in the process of analyzing the experimental data and preparing it for publication. Data from 2004 and results from the five year study is included here in Appendix F. Summary charts for 2000 – 2003 data are also located in Appendix F. A discussion regarding how the field trial results support and influence the grazing plan is included in Appendix G.

Cattle grazing is has been restricted to the wet season, when water is available in the vernal pools and one small stock pond. During the grazing field trial, cattle did not have access to the larger vernal pools where T & E plant populations occur.

Public Uses:

Since public ownership began in 1992, DPR and DFG staff have conducted annual guided wildflower tours of the tabletop. Vehicle access is limited and not permitted past the designated parking area. Until the late 1990's, DPR led 2-3 public field trips each week of the wildflower season. DFG has usually led two field trips each year. Since the late 90's, DPR has led fewer trips and in the last 2 years has led none. DPR has experienced reductions in funding and reorganization of staff assignments. However, an additional reason for the reduced number of public field trips is the declining display of grassland wildflowers (DPR staff, pers. comm.).

III. HABITAT AND SPECIES DESCRIPTION

A. Vegetation Communities, Habitats and Plant Species

See Appendix E for the plant species list.

Several vegetation associations, and special status plants occur on Big Table Mountain. Habitat descriptions are based on the classification described in A Manual of California Vegetation (Sawyer and Keeler-Wolf 1995). California annual grassland covers the largest amount of area, and intergrades with additional habitats and vegetation communities. The Blue oak series is the second most prevalent community on the nearly flat summit of Big Table. It occurs in the deeper soil areas and where tree roots have found sufficient cracks in the basalt. Northern basalt flow vernal pools occur where underlying basalt has few cracks and prevents water from percolating below the surface. Vernal swales occur here as well. They are ephemeral drainages that are sometimes connected to vernal pools but may also occur without pools. Vernal swales and the edges of vernal pools share the same forb-dominated native flora. The vernal pools support three Federal or State listed plant species: succulent owl's clover, Boggs Lake hedge hyssop, and San Joaquin Valley orcutt grass (the last on BLM and private property only) (Figure 5). Trees & shrubs cover the slopes to the north and east of the table top (~400 acres). Vegetation associations have not been mapped on these slopes to date. These associations may include blue oak-interior live oak-foothill pine; blue oak-interior live oak-wedgeleaf ceanothus; and California buckeye-California bay-California ash.

California Annual Grassland

California annual grasslands occur on the tabletop surrounding the northern basalt flow vernal pools and form the understory of the blue oak community. Mediterranean annual grasses introduced in the mission colonial period and later typically comprise over 50% of the vegetative cover in California grasslands today. These non-native grasses have become the dominant species in California grasslands because of the following characteristics:

1) Non-native grasses collectively produce much more seed than natives. Before fall rains, there can be as many as 300,000 germinable seeds per square meter. Most of these are non-native grass seed (Young, et al, 1981).

2) Non-native annual grass seed has only a weak dormancy, therefore, seeds that are in contact with soil germinate en masse after the first ½ " rainfall in autumn (Young, et al, 1981). In contrast, most native seeds need to experience colder weather before their dormancy is broken.

Therefore, the non-native grasses usually germinate one or two months before the native forbs. This circumstance allows non-native grasses to be well-established competitors for light, space, and moisture, before natives enter the competition as vulnerable germinating seeds. .

3) The non-native grasses generally grow taller than the native forbs and thus block needed sunlight for the many sun-loving native forbs.

4) Senescent grasses do not decompose within one year in the Central Valley climate, thus grass mulch may accumulate to a depth of several inches[1]. Thick mulch alters diurnal fluctuations in temperature, light, and humidity at the soil surface (Evans & Young, 1970) and thus suppresses the germination of native forbs while favoring germination of non-native grasses (H. F. Heady, 1956).

California Annual Grassland is a highly competitive environment. In a normal rainfall year, only 20%-30% of the seeds of major species become established seedlings. Seeds of non-native annual grasses do not remain viable into the next season. In fact, most of the 70%-80% of the seed reserves that do not become established seedlings after the first germinating rains lose viability within 5 weeks (Young, et al, 1981).

Thus, rainfall pattern influences relative abundance of native and non-native species as much or more than seasonal precipitation totals. When there is a prolonged mid-winter drought followed by even modest rainfall amounts in spring, native forbs gain an advantage. In such years (2001, 2003), many of the grass seedlings that began growth in September/October are killed by drought stress and cannot be replaced from seed reserves as late as January or February, because most remaining grass seed has lost viability by that time. Normally the peak of native forb germination occurs in December. However, mid-winter drought delays the growth of these native species that are capable of filling available gaps rapidly when rain arrives (J. Bartolome, 1979).

Other competitors for limited resources in California grasslands include the non-native forbs. And the most important of these are several species of Erodium, collectively called, filaree. Filaree and the Mediterranean grasses arrived simultaneously with Spanish cattle in 1769 (P.Raven & D. Axelrod, 1978) and are equally established throughout lower elevation grasslands in California. In years with a mid-winter drought, filaree

[1] Grasses have cell walls reinforced with silica (R.W. Bovey, 1961). Senescent grasses do not decompose readily for this reason. Forbs do not have silica in their cell walls and thus are not retained in the mulch layer to the same extent as grasses.

typically becomes a dominant. In such years, native forbs are still less abundant than non-native species. However, native forbs are more evident in "filaree" years, because the rainfall pattern that is unfavorable to annual grasses is favorable to broad-leaved plants generally. And although filaree may dominate a given "patch" of grassland, it does not cast shade to the same extent as grasses nor does it contribute to the build-up of a mulch layer that will remain to suppress native forb germination in subsequent years.

Dominance of exotic grasses in California Annual Grassland is the status quo, but there are some unusual areas where native forb diversity and abundance remain high. Basalt tablelands are refuges for native forb diversity[2], primarily because thin soils are abundant on these basalt flows and thin soils limit competition from exotic grasses. Where soils average only 5'' deep to bedrock or even less, grasses cannot avoid desiccation between rainfall events in most years. Here, native forbs dominate the vegetation and native grasses (both annual and perennial) are also more abundant than in deeper soil (Big Table & Kennedy Table Grazing Field Trial results, Appendix F).

Where soils are deeper on basalt tablelands native forbs lose the contest for dominance, but if a means is available to limit the competitive advantage of grasses through grazing[3], burning[4], or a combination of methods, even these grassland areas can have a higher relative abundance of native forb species than valley floor grasslands, because of the proximity of native species seed sources.

Big Table has a reputation for abundant spring wildflower displays, however native wildflowers have declined in upland areas as mulch from exotic grasses accumulated during years without grazing (1993-2004). In the first year after grazing was removed, native wildflowers peaked. By

---

[2] Basalt-flow tablelands are well-known throughout California as spring wildflower "hotspots". The Santa Rosa Plateau ER in Riverside County and North Table Mountain ER in Butte County are two examples.

[3] Grazing before germination of native forbs will decrease the height of grasses, thus letting more light reach germination sites for native forbs. Grazing also breaks up the mulch layer through hoof action and to a lesser degree, consumption. This allows more rainfall, light, and favorable diurnal temperature changes to reach critical microsites for native forb germination.

[4] Late spring burns, (when the annual production of grass seeds are retained in the inflorescence) can be very effective for limiting non-native grasses during the following year. However, non-native grasses produce so much seed, that the much reduced non-native grasses in year 1 typically produce enough seed to regain the original level of dominance in year 2 after a burn. (R.Hansen, 1986) Burning is addressed more thoroughly in Section IV.

1996, a trend of declining abundance of native wildflowers was clear. (DPR, DFG staff, CNPS local chapter members, and a CSUF emeritus professor of botany, pers.com.)

The most abundant species on Big Table Mountain are soft chess brome (Bromus hordeaceus), ripgut brome (Bromus diandrus), and wild oat (Avena barbata). In the rockier, thin-soiled areas, non-native grasses are much less dense although still present with native species such as annual fescue (Vulpia microstachys), shooting star (Dodecatheon clevelandii ssp. patulum), stonecrop (Parvisedum congdonii), and goldfields (Lasthenia californica). Perennials in thin soil areas and rock outcrops include narrow-leaved soap plant (Chlorogalum angustifolium), woodland star (Lithophragma bolanderi), melic grass (Melica imperfecta) among others. Lists of native and exotic species found in four Big Table grassland ecotypes are included in Appendix F along with frequency data for individual species and species guilds (native forbs, native grasses, non-native forbs, non-native grasses). Two grassland species meet their southern range limit on Big Table Mountain, Chlorogalum angustifolium and Navarettia tagetina.

Generally, on the tabletop native species make up a greater per cent of the vegetative cover and composition where upland grasses are limited either by seasonal saturation (vernal swales and pool edges) or inundation (vernal pools) or by an inadequate rooting depth (shallow soils & rock outcrops).

Tree and Shrub Vegetation Associations

Blue Oak Savanna and Blue Oak Woodland

Blue oak is the dominant tree in open savannas on the tabletop and slopes with a southerly or western exposure. Blue oak is a drought deciduous species. In years when rainfall is scant, blue oak will drop its leaves by late summer or early fall to conserve moisture. This adaptation allows blue oak to occupy the hottest terrain of any California oak species (Pavlik et al, 1991).

Within the filtered shade of the blue oak savanna native herbaceous species such as miners lettuce (Claytonia perfoliata), lacepod (Thysanocarpus curvipes), and common madia (Madia elegans) occur among the exotic annual grasses.

Throughout the range of blue oak and here as well, blue oaks rarely survive the seedling stage to become saplings. Researchers agree that there is insufficient blue oak regeneration occurring to maintain current stands (Pavlik et al 1991). Most blue oak seedlings occur in the shade of mature trees where they remain seedlings for many years until a light gap

is created in the canopy through natural mortality or tree cutting. With the removal of shading and release from competition for moisture with an over-topping oak, seedlings can grow rapidly into saplings (Swiecki and Bernhardt, 1998). However, this scenario rarely occurs in blue oak woodlands today,

Although causes vary locally, there are four hypotheses for the lack of regeneration in blue oaks: 1) Non-native annual grasses are more competitive for water in spring (a critical time for young oaks) than the native forb-dominated grassland that was the natural understory in blue oak woodlands. 2) Exclusion of fire in the last century has altered normal ecological processes.[5] 3) There has been an increase in rodent populations that damage oak seedlings and saplings (J.Tecklin and D.McCreary).[6] 4) The introduction of grazing livestock has been detrimental since both sheep and cattle browse oak seedlings.

Although most of the tabletop and slopes of Big Table have not been grazed by cattle since 1993, the few sapling oaks that are present appear to be older than 11 years. Deer browse is fairly severe. Small blue oaks are heavily and recently browsed and exhibit a bonsai-like appearance. (photos in Appendix D). Browse lines are distinct on the lower branches of mature oaks. (photo ___, April, 2004). These are not unusual observations in oak woodlands where grazing has been eliminated (Swiecki & Bernhardt 1998, D. McCreary 1997). Removing livestock does not remove other barriers to regeneration and may exacerbate negative factors such as high rodent populations and competition for soil moisture (J. Tecklin & D. McCreary).

Fire may have been benign before the introduction of exotic grasses, but since that time young oaks are often killed when adjacent dry grasses burn. Mature blue oaks are usually not killed by fire. Where above ground damage is severe, trees may resprout from the roots. Saplings and seedlings may also resprout after infrequent fires, but fire recurring within 5 years has caused seedling survival to drop to zero (Swiecki & Bernhardt 1998). Blue oaks tolerate fire, but fire is not required for blue oak regeneration nor has it been found to stimulate regeneration.(Swiecki and

[5] This is true as far as the statement goes. Unfortunately, with non-native grasses contributing to increased fuel loads, fire cannot have its former normal ecological effect. Incidentally, a combination of grazing and fire was used between the 1850's and 1930's to convert woodlands to grassland (Swiecki and Bernhardt 1998).

[6] Non-native annual grasses produce larger and more numerous seeds than the perennial native grasses and native forbs they have replaced, thus increasing the food supply for rodents. In addition, in ungrazed or lightly grazed situations, the non-native annuals form dense cover for rodents such as meadow mice (Microtus californicus) that are known to strip bark from oak seedlings and cause mortality (D. McCreary, J. Tecklin).

Bernhardt 1998).

The use of Treeshelters[7] in areas where cattle and deer are present has been shown to enhance growth of blue oaks and greatly reduce the time required for saplings to grow above the reach of browsers (D. McCreary 1997). In California's altered Blue oak – grassland ecosystem, the best available management practice may be to use Treeshelters strategically in light gaps of fallen oaks where seedlings could transition to saplings with some protection from herbivores (rodents, deer, cattle, and insects).

Other Woodlands and Chaparral

Dense woodlands and chaparral cloak the slopes to the north of the tabletop. Here, blue oak is associated with foothill pine, interior live oak, and many shrub species including white leaf manzanita (Arctostaphylos viscida), chaparral whitethorn (Ceanothus leucodermis), buck brush (Ceanothus cuneatus), yerba santa (Eriodictyon californicum), California buckeye, western redbud (Cercis occidentalis), hoary coffeeberry (Rhamnus tomentella), holly-leaf redberry (Rhamnus ilicifolia) and blue elderberry (Sambucus mexicana). In moist drainages on the northerly slopes, spicebush (Calycanthus occidentalis), California bay (Umbellularia californica), buttonwillow (Cephalanthus occidentalis) and California ash (Fraxinus dipetala) can be found.

Many native wildflower species occur in the understory on the northerly slopes. A few examples are, Chinese houses (Collinsia heterophylla), foothill pseudohabia (Pseudobahia heermanii), baby blue eyes (Nemophila menzeisii), fiesta flower (Pholistoma auritum), common madia, Hansen's larkspur (Delphinium hansenii), and several species of farewell-to-spring (Clarkia cylindrical ssp. clavicarpa, C. dudleyana, C. unguiculata, and more). Table Mountain has long been a favorite destination for local botanists who have collaborated to produce the extensive species list found in Appendix E. And yet new species can still be found. In 2004, an uncommon shrub, Sierra bladdernut (Staphylea bolanderi) was found at the base of cliff talus on a northeast-facing slope. An undescribed species in the Apiaceae (*Perideridia species nova*) occurs in openings in blue oak woodland just below the tabletop. This species may be limited to Big Table Mountain only and would by definition be rare (D.Haines, pers com).

Vegetation associations have not been mapped on the Big Table Mountain property. Without first doing field reconnaissance, most of the

[7]Treeshelters are rigid, translucent, double-walled plastic cylinders of varying heights. They have been tested in blue oak restoration experiments at the Sierra Foothill Research and Extension Center (University of California), and elsewhere.

tree and shrub associations cannot be identified. Only blue oak savannah and California annual grassland can be mapped with some certainty on an aerial photo. Figure 5 is a

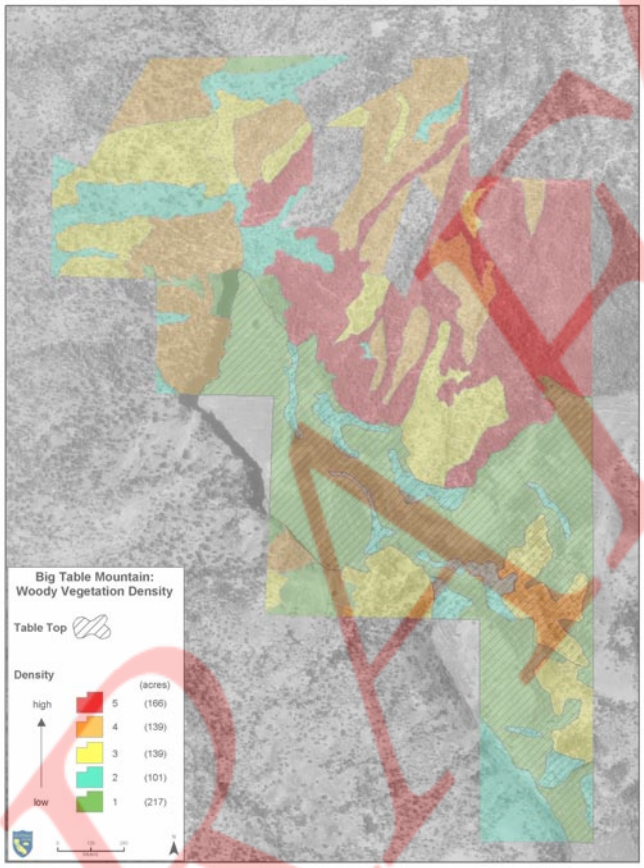

Figure 5. Woody vegetation density on Big Table Mountain.

satellite image with polygons delineated for five levels of woody vegetation density. Potential woody vegetation associations include, blue oak woodland, blue oak-interior live oak-foothill pine; blue oak-interior live oak-wedgeleaf ceanothus; and California buckeye-California bay-California ash.

Northern Basalt Flow Vernal Pools

Vernal pools and swales on Big Table Mountain are sparse, but significant features formed in depressions within tertiary[8] volcanic mudflows.

[8] 8 – 12 million years old..

Seventeen pools on the DFG acreage range in size from less than 400 square feet to more than 2 acres. Vernal swales total approximately one mile in length. These vernal wetlands are classified as northern basalt flow vernal pools, a relatively rare type due to the unique geologic conditions associated with their formation (Sawyer and Keeler-Wolf 1995). The majority of northern basalt-flow vernal pools have formed along the eastern side of the Central Valley (Smith and Verrill 1996). In the San Joaquin Valley, northern basalt-flow vernal pools exist in only two complexes, the first both north and south of the San Joaquin River in Fresno and Madera Counties and the second in Tuolumne County near the Stanislaus River. The vernal pools are larger and have a more diverse flora in the San Joaquin River complex that includes pools on Big Table Mountain, Kennedy Table, and McKenzie Table.

Low growing, annual herbs dominate the vernal pool vegetation. Germination begins after the fall rains and flowering occurs between the months of February and May (Holland 1986). As the growing season progresses and the water recedes, many species bloom in sequence, encircling the pools with concentric rings of colorful flowers. By May, most species have completed their life cycles or have gone dormant. Some vernal pool species of interest on Big Table Mountain include downingia (Downingia spp.), meadowfoam (Limnanthes douglasii), checkerbloom (Sidalcea calycosa), vernal pool onion (Allium hyalinum, A. praecox), Douglas' pogogyne (Pogogyne douglasii), succulent owl's clover, and Bogg's lake hedge-hyssop.

The unique and somewhat harsh environment within a vernal pool tends to discourage the establishment of non-native plants. However, a few non-natives do occur, including Mediterranean barley (Hordeum marinum ssp. gussoneanum), Italian ryegrass (Lolium multiflorum, at a low level on Big Table) and mousetail fescue (Vulpia myuros). These species generally remain within the shallow perimeter, competing with pool edge and swale species such as meadowfoam, checker mallow (Sidalcea calycosa), tidy tips (Layia fremontii), yellow carpet (Blennosperma nanum), and a native clover (Trifolium variegatum)..

Two vernal pool species, Lasthenia glaberrima and Gratiola heterosepala, have southern range limits on Big Table Mountain.

B. Animals

Many animal species utilize Big table Mountain's habitats and communities (Appendix E). Vernal pools provide relatively predator-free habitat[9] in the winter and spring for branchiopods (members of the

[9] Vernal pools do not have fish as a natural component of their fauna. This is a primary

crustacean class Branchiopoda such as water fleas (Daphnia spp.) and fairy shrimp) and amphibians. Immature tree frogs (Pseudacris regilla) and western toads (Bufo borealis) are commonly observed in drying vernal pools during the late spring.

Big Table Mountain is a valuable resource for nesting, foraging and migrating birds and mammals. Prairie falcons (Falco mexicanus), golden eales (Aquila chrysaetos), American kestrels (Falco sparverius), horned larks (Eremophils alpestris), western meadowlarks (Sturnella neglecta), white-throated swifts (Aeronautes saxatalis), and western bluebirds (Siala mexicana) are frequently observed nesting or foraging. Mammals such as bobcats (Felis rufus), gray squirrels (Sciurus griseus), mule deer (Odocoileus hemionus) and western mastiff bats (Eumops perotis) are also common. Mountain lion (Felis concolor) range through the area.

C. Endangered, Threatened and Rare Species

For the purposes of this management plan, rare plants and animals are those listed as Threatened or Endangered or as CDFG Species of Special Concern. The majority of the information about Big Table Mountain flora and fauna has come from DFG and DPR staff observations. Additional occurrence information was derived from the California Natural Diversity Database (CNDDB). Annual upland and vernal pool vegetation monitoring conducted by DFG personnel has further refined the knowledge of the distribution and abundance of rare plant species.

1. Plants

Three rare plants occur on Big Table Mountain: succulent owl's clover, Bogg's Lake hedge hyssop, and San Joaquin Valley orcutt grass. All are associated with vernal pools. The San Joaquin Valley orcutt grass occurs on BLM property adjacent to DFG property; to the south.

Succulent owl's clover

Succulent owl's clover is an annual member of the snapdragon family (Scrophulariaceae). It is a Federally Threatened and California State Threatened species. It is also listed as a California Native Plant Society (CNPS) list 1B plant, meaning that it is "rare, threatened or endangered in California and elsewhere" (Tibor 2001). Succulent owl's clover can reach 11.8 inches in height. It has fleshy (succulent) leaves. The flowers, which appear in April and May, are yellow and tubular, with three small pouches near the tip. The flowers are clustered in a spike with a bract subtending each flower and extending beyond the flower tips. Succulent

---

factor that allowed the development of the freshwater crustacean fauna of vernal pools and the use of vernal pools for the larval development of amphibians.

owl's clover appears to favor pools deep enough to exclude non-native, annual, hydrophytic grasses. This species occurs in four pools on the DFG-owned portion of Big Table Mountain and in one pool on a BLM-owned portion. (Figure 6).

Bogg's Lake hedge-hyssop

Bogg's Lake hedge-hyssop is also a member of the snapdragon family. It is a California State Endangered Species and is a CNPS list 1B plant (Tibor 2001). Bogg's Lake hedge-hyssop is an erect annual that can reach a height of 3.9 inches. It occurs in two vernal pools on the DFG-owned portion of Big Table Mountain and one pool on the BLM portion (Figure 6). Bogg's Lake hedge-hyssop appears to grow in the deeper regions of large vernal pools where there may be less competition or longer periods of inundation.

San Joaquin Valley Orcutt grass

San Joaquin Valley Orcutt grass , a member of the Orcuttieae tribe of the grass family (Poaceae), is a California State Endangered and Federally Threatened species. CNPS lists it as 1B (Tibor 2001). San Joaquin Valley Orcutt grass is an annual that may bloom as early as April or as late as September (Tibor 2001). This species requires a long inundation period in order to germinate. Seeds may remain viable for years awaiting appropriate conditions for germination. Like other members of the Orcuttieae tribe, San Joaquin Valley Orcutt grass exudes a resinous substance at maturity, which is believed to deter herbivory (B. Crampton 1976). Fluctuations in population size and germination from year to year are common. San Joaquin Valley orcutt grass is known to occur in only one pool on Big Table Mountain that is partially owned by BLM and a private individual. Figure 6).

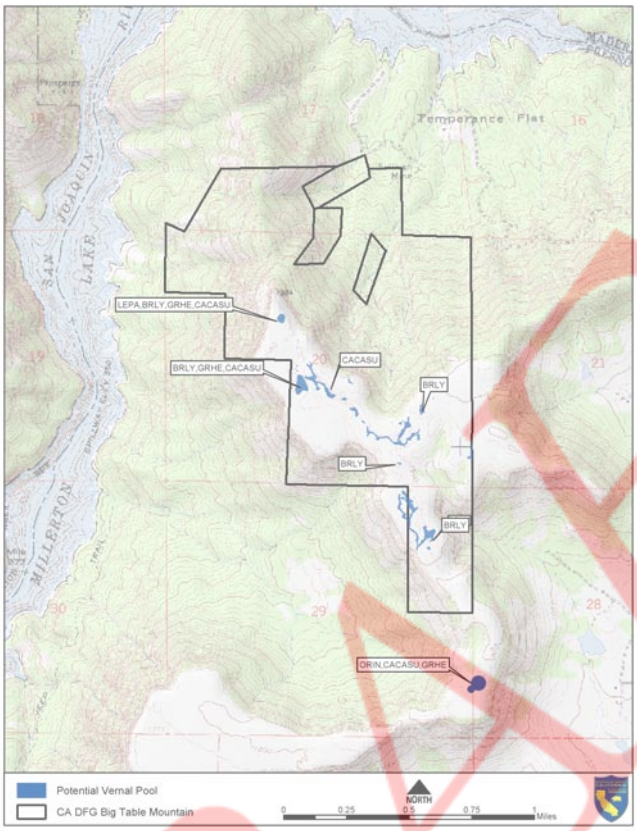

Figure 6. Locations of rare vernal pool species at Big Table Mountain. BRLY= Branchinecta lynchi, CACASU=Castilleja campestris succulenta, GRHE= Gratiola heterosepala, LEPA= Lepidurus packardi, ORIN= Orcuttia inaequallis

2. Animals

DFG and DPR personnel have not yet completed animal inventories on Big Table Mountain . However, several animal species that are known to occur or that have the potential to occur have been targeted for management. These include the vernal pool fairy shrimp, vernal pool tadpole shrimp, Valley elderberry longhorn beetle, molestan blister beetle, golden eagle (Aquila chrysaetos), California horned lark (Eremophila alpestris), prairie falcon (Falco mexicanus), spotted bat (Euderma maculatum), western mastiff bat (Eumops perotis), and mountain lion.

Vernal pool fairy shrimp

Vernal pool fairy shrimp is a Federal Threatened crustacean species in the order Anostraca (small aquatic crustaceans lacking a carapace; fairyshrimp and brineshrimp). In spite of its wide range in California, from Shasta County south through much of the Central Valley, it is rarely abundant anywhere. Cysts hatch early, as soon as water temperatures reach 50 degrees Fahrenheit. Maturity is reached in 18 to 41 days,

depending on water temperature. Vernal pool fairy shrimp are among the shortest-lived of the Central Valley fairy shrimp. Several cohorts may be produced in a single season, as determined by water temperature and availability (Eriksen and Belk 1999). Vernal pool fairy shrimp have been identified in six pools on Big Table Mountain (Figure 6) (Durgarian 2001).

Vernal pool tadpole shrimp

The vernal pool tadpole shrimp (Branchinecta lynchi) is a Federal Endangered crustacean in the order Notostraca. A large carapace[10], compound eyes, and long cercopods[11] at the end of the last abdominal segment give this species a distinctive, horseshoe crab-like appearance. Tadpole shrimp populations re-emerge from dormant cysts as winter rains fill vernal pool depressions. They can reach maturity within 3 to 4 weeks of vernal pool formation and are relatively long-lived, with a typical population lasting 143 days (Vollmar 2002). Organic matter and living organisms such as fairy shrimp and other invertebrates make up their diet. Vernal pool tadpole shrimp are known to occur in the northernmost vernal pool on Big Table Mountain (Figure 6). Even when present in a vernal pool complex, L. packardi is often absent from nearby apparently suitable pools and its presence or absence tends to be persistent (King, 1996). The Big Table Mountain vernal pool tadpole shrimp population is isolated from other populations occurring nearby on the floor of the San Joaquin Valley. This isolation may have contributed to the unique genetic qualities of this population. Although the genetic differences do not warrant subspecies status (King 1996), the preservation of this unique population is warranted.

Valley elderberry longhorn beetle

The Valley elderberry longhorn beetle (Desmocerus californicus dimorphus) is an insect in the order Coleoptera. It is a Federally Threatened species that occurs in Central Valley riparian forests. This beetle is highly specialized; it is restricted to the bark and foliage of elderberry shrubs (Sambucus spp.) throughout its life cycle. Female beetles lay their eggs in bark crevices. Larvae burrow into the interior of the tree, feeding on the bark and interior wood for 1 to 2 years. Adults emerge from small, oval-shaped exit holes in the spring. Adult beetles feed on elderberry tree foliage until early summer when the breeding season begins (USFWS 1984).

Elderberry shrubs typically occur in or near riparian areas along the

[10] In this case, a carapace is a chitinous shield covering the back.

[11] Cercopods are appendages used for swimming.

Sacramento, American, San Joaquin, Kings, Kaweah and Tule rivers and tributaries. These shrubs are common on the north slope of Big Table Mountain, and in this relatively moist location the Valley elderberry longhorn beetle is likely to occur. The beetle has been found in similar situations on the Kaweah and Kings Rivers. (D. Haines, pers. comm.) Surveys for the beetle have not been done on Big Table Mountain.

Molestan blister beetle

Molestan blister beetle (Lytta molesta) is an insect in the order Coleoptera and a California State species of special concern. It occurs in the Central Valley from Contra Costa County south to Tulare and Kern Counties.. Lytta parasitize the nests of wild bees, feeding on provisions or immature stages of the bees (Selander 1960). Adults feed on flowers or foliage (White 1983). Specimens have been collected on various plant species, including lupine (Lupinus spp.) (D.Haines) and filaree (Erodium spp.) (Selander 1960). Specimens taken from "near the summit of the northern part..." of Big Table Mountain were observed on vegetation in dried vernal pools (D. Haines, 1980). They were common in dry pools with blooming annuals, but were absent from green, or flowering vegetation adjacent to the pools. The beetles may simply be following a humidity gradient since the upland soils dry sooner, the vernal pool soil and vegetation produce a relatively humid zone near the end of spring. Coincidentally, this flowery humid zone also attracts native bees on which the beetle catches a ride to the underground burrow where the bee will lay its eggs. (D. Haines, pers. comm).

Golden eagle

The golden eagle is a California State species of special concern in the family Accipitridae, inhabiting mountains, foothills and open country. Golden eagles in the western United States are often non-migratory, permanent residents. Their large size enables them to prey on animals as large as foxes and young deer. Other prey items include small mammals such as ground squirrels (Spermophilus beecheyi), rabbits (Sylvilagus audubonii), voles (Microtus californicus) and mice (Mus musculus, Peromyscus maniculatus). They are also known to prey on gamebirds, snakes, lizards and large insects. Although primarily predatory, golden eagles will occasionally scavenge for carrion. Golden eagles are thought to mate for life. Nest sites are often on cliff ledges, although trees may be used as well. Both sexes construct a nest of large sticks lined with moss, leaves and grass. Golden eagles are generally faithful to a particular nest site for many years (Kaufman 1996). Golden eagles have been observed nesting in a foothill pine at the base of the north-facing cliff (Koshear pers. comm., Peck pers. comm.).

California horned lark

The California horned lark, of the family Alaudidae, is a small, ground-dwelling bird of grassland and open, barren ground. It is a California State species of special concern, although it occupies a wide range throughout North and Central America as well as central Asia. The California horned lark may occupy both lowland and alpine habitats throughout the year. Suitable breeding habitat is limited to open, barren ground before grasses reach heights greater than an inch or two. Population densities increase relative to the amount of bare ground. Grazed, mowed, and tilled agricultural fields are where California horned larks forage for seeds and insects and are therefore among the habitats they use most heavily. Preferred nest sites are on bare soil within natural depressions. The female may improve the nest "cup" by kicking dirt from the depression. A nest is then woven from fine plant material collected nearby (Beason, 1995). Horned larks are frequently observed on Big Table Mountain, notably in open, grassland habitats during the winter and spring seasons.

Prairie falcon

The prairie falcon, of the family Falconidae, is a California State species of special concern that inhabits open habitats such as arid desert plains, grasslands and alpine tundra. They are able to exploit a wide range of elevations where vegetation is low and/or sparse, feeding primarily on ground squirrels, lizards and horned larks. Occasional small rodents and passerines are taken as well (Steenhoff 1998). Prairie falcons nest primarily in cavities, crevices, and on ledges of cliffs and rock outcrops. Nest sites are often built on overhung and south facing cliff features. Such features may offer protection from inclement weather as well as high temperatures during the late spring. Prairie falcons have been observed performing courtship or territorial behavior along the cliffs of Big Table Mountain (Endangered Species Recovery Program (ESRP) unpublished data 2002).

Human activities are known to adversely affect prairie falcons. Illegal shooting is known to discourage adults from attending to their nests and shooting is a common cause of mortality. Other causes of death include exposure to pesticides and contaminants. Pesticide exposure is especially common near agricultural areas, where prey ingest higher levels of pesticides and contaminants. Secondary poisoning by lead bullets is also a problem when prairie falcons consume prey that has lead shot in their tissues. Prairie falcons may be legally harvested for falconry in California; they are the second most harvested bird of prey in the U.S. (Steenhoff 1998). Accordingly, harvesting birds for falconry has the potential to seriously affect prairie falcon populations. Because prairie falcons are dependent on rock outcrops and cliffs for nesting habitat for breeding, they are susceptible to disturbance from rock climbing, hang

gliding and perhaps other recreational activities. Big Table Mountain cliffs on the other hand, provide optimal habitat, because they are surrounded by a private nature preserve and other public lands where conservation of species is a high priority.

Prairie falcons forage in grasslands and open habitats that are often used for grazing (Steenhoff 1998). Well-managed grazing may benefit the species by reducing the height of the non-native grasses and mulch, thereby increasing visibility of prey.

Spotted bat

The spotted bat is a member of the vesper bat family (Vespertilionidae) and has been detected in the Big Table Mountain vicinity (Vollmar 2002). A California State species of special concern, spotted bats are dependent on rock-faced cliff roosting habitat, which limits their geographic distribution. A low frequency, echolocation call is audible to human ears. The spotted bat forages high over forest openings, riparian habitat, wetlands, and old agricultural fields. Moths make up the bulk of its diet.

Western mastiff bat

The western mastiff bat, a member of the free-tailed bat family (Molossidae), is known to inhabit the basalt cliffs of Big Table Mountain (Figure 7). A California State species of special concern, the western mastiff bat is distinctive as North America's largest species of bat. An audible, low frequency echolocation call makes it easily detectable in foraging areas. This species forages over chaparral, oak woodland and grassland. Its diet consists of moths (Lepidoptera), crickets (Gryllidae and Gryllacrididae), and katydids (Tettigoniidae). Migration usually is limited to short distances, often to a nearby cliff, which better protects the colony from seasonal temperature fluctuations (Pierson 1998). Western mastiff bats have colonized a large overhang on a south-facing portion of the Big Table Mountain cliff face, which is owned by BOR (Figure 7). The duration and frequency of colonization is not known; and the colony is suspected to migrate to other nearby locations. More information of the colony's habits is needed to accurately address its needs.

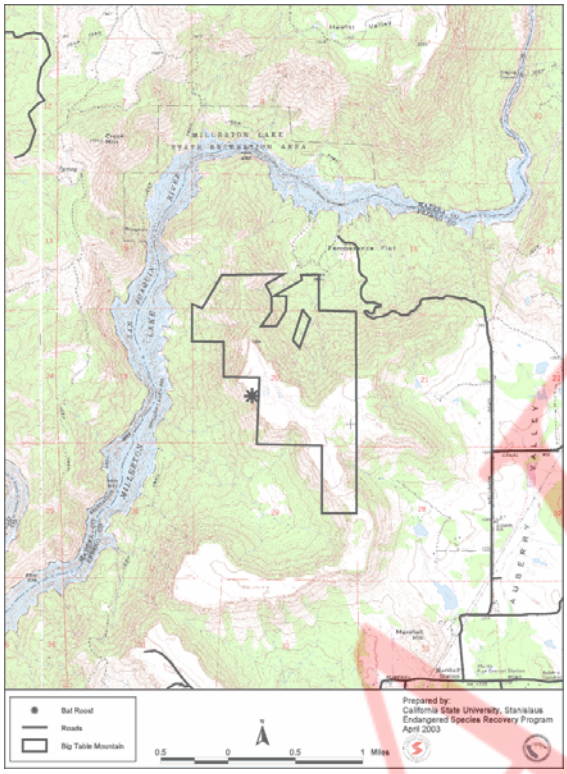

Figure 7. Western mastiff bat colony location.

IV. MANAGEMENT GOALS AND ENVIRONMENTAL IMPACTS

A. Definition of Terms Used in This Plan

Element: an element refers to any biological unit, public use activity, or facility maintenance program as defined below for which goals have been prepared and are presented within this plan.

Biological Element: These elements consist of species, habitats, or communities for which specific management objectives have been developed within the plan. Criteria used to identify biological elements include but are not limited to:

Protection of the element as authorized or mandated by legislation or official policy (e.g., further goals of North American Waterfowl Plan, Wetlands Policy, or Proposition 70)

Any listed or candidate species or species of special concern known or suspected to occur on the site

Essential habitat for one or more listed species

Habitats manipulated or enhanced to benefit wildlife

Restoration efforts which may restore an extirpated species or habitat, or maintenance efforts which may avoid the threat of extirpation

Public Use Element: Any recreational, scientific, or other use activity appropriate to and compatible with the purposes for which this property was acquired. Criteria used to identify public use elements include:

Use that is authorized or mandated by legislation or official policy (e.g. hunting, fishing, birding, photography, and nature study),

Use that is compatible with fish and wildlife requirements in the area if properly managed (e.g. research, nature trails, and interpretive program), and

Historical uses (which may be restricted seasonally or year-round under this plan due to incompatibility with biological element needs).

Facility Maintenance Element: A general-purpose element describing the maintenance and administrative program, which helps maintain orderly, and beneficial management of the area.

Biological Goal: This is the statement of intended long range results of management based on the feasibility of maintaining, enhancing, or restoring species populations and/or habitat. An **objective** would be a shorter term implementation target. **Tasks** are the individual projects or work elements, which are useful in planning operation and maintenance budgets.

Public Use Goal: A public use goal is the statement of the desired type and level of public use compatible with the biological element goals previously specified within the plan.

B. Biological Elements: Goals & Environmental Impacts

Biological Element 1. Habitats on the tabletop including, California annual grassland and Northern basalt flow vernal wetlands (pools and swales), and stands of blue oak.

Rare, threatened, or endangered plants and animals or species of concern associated with Northern basalt flow vernal pools and annual grassland on Big Table Mountain.

Succulent owl's clover – CE, FT

Gratiola heterosepala - CE

Vernal pool fairy shrimp - FT

Vernal pool tadpole shrimp – FE

Horned lark – CSC

Prairie falcon - CSC

Biological Goal 1. Long-term improvement of native plant species diversity and abundance in California annual grassland on Big Table Mountain while maintaining current relative per cent cover of native species in vernal pools and current population parameters of associated special status species.

Task (1.1) Install weather-recording gear on Big Table to aid in interpretation of data from all monitoring efforts.

Task (1.2) Continue % cover and litter depth monitoring in vernal pools 1-3. As time allows, monitor additional pools.

Task (1.3) Monitor cattle use of pools weekly with a combination of Sierra Foothills Conservancy and DFG personnel. Record dates for pool filling and drying & water temperature. Survey pools for presence of vernal pool crustacea. Check for exotic animal and plant species.

Task (1.4) Continue frequency monitoring for CACASU and GRHE. GPS populations edges annually.

Task (1.5) Monitor Residual Dry Matter (RDM) in and near pools. This parameter affects the hydrology of pools.

Task (1.6) Continue % cover and litter depth monitoring on BT swale transects. Obtain equivalent data from at least one Kennedy Table swale annually.

Task (1.7) Monitor native pollinators for Downingia, Blennosperma, and Limnanthes on Big Table and Kennedy Table annually. Confirm presence of Lytta molesta (molestan blister beetle).

Task (1.8) Measure width of vernal pool edge and swale flowering zones annually at permanent transects.

Task (1.9) Implement grazing plan. This includes data handling and analysis for use in adaptive management.

Task (1.10) Monitor grazing effects on native perennial grass species in

rock outcrops and shallow soil areas. Continue % cover and litter depth monitoring on shallow soil areas.

Task (1.11) Continue % cover and litter depth monitoring on deep soil upland transects.

Task (1.12) Monitor Residual Dry Matter in deep-soil upland on permanent transects.

Task (1.13) Develop a burn plan. Coordinate with CDF and any other local fire suppression agencies to be sure they are aware of DFG guidance for protection of habitats.

Task (1.14) Develop a prescribed fire pilot project plan and implement within the five years covered by this management plan.

Task (1.15) Find a volunteer bryologist or a student to inventory bryophytes on outcrops. Do a small-scale photo-monitoring of bryophytes for records of management effects. (No effect is expected, but documentation would be useful.)

Task (1.16) Develop and implement a pilot project for reintroducing native perennial grass species to deep soil locations on the tabletop.

Task (1.17) Survey blue oak stands for regeneration. Implement a blue oak regeneration enhancement project. Monitor results compared to equivalent habitat without seedling protectors. Plantings are recommended in lightgaps without natural seedlings.

Task (1.18) Continue GPS mapping of noxious weeds and use hand-control methods where infestations have native sunflowers or clovers nearby.

Task (1.19) After mulch is reduced by grazing, use Transline on GPS locations of noxious weed infestations, provided no susceptible native plants are within the spray zone.

Enviromental Impacts

Grazing, Burning and CEQA:

Grazing and prescribed burning are exempt projects under CEQA, Class 7, as actions undertaken by regulatory agencies "…to assure the maintenance, restoration, or enhancement of a natural resource…." Monitoring also falls under this category.

The following discussion of potential positive and negative impacts of grazing, burning and rest are intended to serve as a reference for DFG land management personnel.

Grasses of Mediterranean origin dominate the upland herbaceous vegetation on Big Table Mountain. As noted in Section III, non-native grasses out-compete native forbs and grasses for space, light, water, and nutrients in four ways: flooding available germination sites with seed, early germination, shading, and the production of dense mulch. Grazing limits the competition-effects of non-native grasses on native forbs by decreasing the impacts of excessive mulch, shading, and water consumption. Burning also has these effects and can decrease the flooding of germination sites with exotic grass seed for the first year or two after a strategically-timed burn.

The "grazing" under discussion here is a moderate grazing program as described in Appendix G. Cattle will be removed from Big Table by mid-March.

Expected Positive impacts:

1) The mulch layer that currently blankets many acres of upland on Big Table will be broken up by cattle hooves and will at least be partially consumed as cattle attempt to reach young grasses growing through the mulch. The fractured mulch layer will be more readily decomposed and will allow more sunlight and natural diurnal temperature changes to reach native forb germination sites. The abundance of native forbs is expected to increase in upland, vernal swale, and vernal pool edges over a period of several years to resemble levels currently found on Kennedy Table in equivalent habitats (Grazing Field Trial, Appendix F).

2) Shading and other competition effects of current-year grasses on the native forb guild will be lessened. Cattle selectively graze young grasses, preferring them to forbs (Griggs, 2000). Thus grazing in mid-winter can decrease the competitive advantage conferred on exotic grasses by early germination. Without grazing, exotic grasses establish and grow tall enough to shade the soil surface before native forb seed dormancy is broken. With grazing at the appropriate season (Nov-Jan) shading inhibition of native forb germination and seedling establishment can be mitigated.

Potential positive impacts:

3) Broadening the range of microsites available to plants and animals. Trampling effects of cattle can be both positive and negative. Item one, above notes one far-reaching positive effect, breaking up and eventually removing excessive mulch. A second positive effect is a measurable

increase in the diversity and relative abundance of native graminoids (see Field Trial results, Appendix F). Native graminoids, such as Juncus bufonius, Juncus effusus var. pacificus, Eliocharis acicularis, Pilularia americana occur frequently in hoofprints in vernal wetlands. Hoofprints concentrate moisture as vernal wetlands dry in the spring, providing moist microsites where certain species can prolong growth and complete their life-cycles (Vollmar, 2002). This circumstance may benefit vernal pool crustacea as well as plant species.

4) Compaction of vernal pool basins. This benefit is noted in a recent study (J. Marty, 2003) performed in an area with clay pan vernal pools. Soil compaction, combined with reduction of exotic grasses and mulch within the small watershed areas surrounding vernal pools was shown to significantly increase the period of water retention in vernal pools. Longer water retention provides benefits for vernal pool crustaceans and vernal pool flora. Pools with longer inundation periods have fewer exotic plant species and generally a more diverse native flora. Longer inundation periods are vital for vernal pool crustaceans to produce cysts for repopulating the pool when it refills in future winters.

5) Mitigating competition between young blue oaks and exotic grasses for light and water (W. E. Frost, 1996).

6) Reducing protective cover for rodents and increasing predation success for raptors and other predators. High rodent populations have been cited as one factor that prevents regeneration of native oaks (Pavlik et al, 1991).

7) Reducing the mulch layer and the height of vegetation in open grassland will improve the habitat value for horned lark and prairie falcon, both biological elements. Western bluebirds, and lark sparrows will also benefit from a more open grassland with less senescent material (Point Reyes Bird Observatory, 2002).

8) Increasing the abundance of native forbs and removing thick mulch will benefit native pollinators, including ground-nesting solitary bees, bee-flies, beetles (including the Molestan blister beetle (FT))[12].

---

[12] Native pollinators fulfill a critical function in the vernal pool grassland ecosystem. Introduced honeybees are too large to pollinate many of the vernal pool endemic plants that must be pollinated by host-specific bees. These native pollinators burrow in soil to lay eggs which develop through larval stages over winter and emerge as adults when their host plants begin to bloom in the grasslands and vernal pools. Despite their soil-burrowing habit, these bees and bee-flies have the ability to thrive in grazed vernal pool grasslands. Native pollinators are remarkably abundant on Kennedy Table, where native wildflowers blanket many acres and seasonal grazing has occurred for over 100 years.

Native pollinators are markedly less evident on Big Table, although still present near the

9) Increasing populations of native invertebrates would improve food sources for insectivorous birds.

10) Populations of the biological elements, succulent owl's clover, and Boggs Lake hedge hyssop may increase in density. This is a potential effect that DFG staff will be monitoring. Populations of these species occur in most of their range with grazing.

Competition with *Eliocharis macrostachya*, a native spike-rush that tends to develop monotypic stands in vernal pools that are not grazed, may be limiting favorable sites for Boggs Lake hedge hyssop. Both grow in the deepest portions of pools on Big Table, but not together. (Grazing Field Trial Results, Appendix F)

11) The potential negative effects of prescribed burning are avoided (see below).

12) Fuel load will be decreased, thus reducing the probability of a damaging wildfire. Current fuel loads are very high (7000 lbs per acre in the most productive areas). If a prescribed burn were attempted, It would be difficult to avoid a hot burn that would be damaging to oaks, wildlife, and perhaps native seed banks.

Potential Negative Impacts of Grazing:

1) The Biological Elements, succulent owl's clover, and/or Boggs Lake hedge hyssop may decline in population density.

Populations of these two sensitive vernal pool species will be monitored for population trends. Both of these species also occur on Kennedy Table where seasonal grazing is on-going. Although frequency values for these species were higher in both sampling years on Kennedy Table, statistical analysis (NCSS, at the .05 level) does not show a significant difference for these species on the two Table Mountains. In other words, the baseline frequency values for these species in grazed and ungrazed treatments are statistically equivalent.

2) Introduction of additional exotic plant species.

Supplemental feeding of hay that may contain weed seed will not be permitted on Big Table. However, it is still possible with any grazing program that weed seed may be transported in the animals coat or in their gut contents. DFG staff will have an ongoing program to deal with existing

---

concentrations of native wildflowers in vernal pools.

populations of exotic thistles. Therefore, personnel will be searching for weed infestations on a regular basis, so that control actions can be implemented at the appropriate time to prevent a widespread infestation.

3) Excessive trampling of vernal wetlands.

Moving cattle off the tabletop by mid-March before the normal onset of warm weather, should avoid severe trampling of these habitats. In the event of unusually warm weather during the grazing period the cattle rancher will be directed to move the cattle away from the large vernal pools in the northern half of the tabletop. An additional source of water has been installed in 2004 on Sierra Foothills Conservancy property in the southern half of the tabletop. This artificial water source enables managers to water cattle without relying on water in the vernal pools. The water tank is not located near any deep pools and it is sufficiently far from vernal swales, that no significant impacts to these habitats are expected through frequent use of the tank by cattle. In addition, the artificial water source in the southern half of the tabletop, should draw cattle away from the vernal pools during times of low rainfall when vernal pool edges are most vulnerable to excessive trampling.

4) Excessive soil compaction in general.

A very moderate level of grazing is being proposed. In excessively dry years, or under any condition where damage is likely to occur, cattle can be redirected to adjacent land in Smith Basin. Under favorable conditions, cattle will be present for half of the year at moderate stocking rates (Appendix G, Grazing Plan).

Before the property was purchased by WCB, it was grazed year-round with no observable concern for native habitats. The current situation is very different. Habitat improvement goals have priority. Grazing effects will be monitored by DFG staff. All observable negative effects on habitats will be noted and corrective actions will take place in response.

5) Cattle wastes may have negative water quality impact on pools.

This is a second effect that is generally observed when cattle remain in vernal pool grasslands during warm weather (over 80 degrees). The timing and relatively low intensity of grazing should prevent this effect for the most part. During an exceptionally dry or warm season, a temporary electric fence can be put into operation that will bar cattle from moving into the north end where the large pools are located.

6) Cattle grazing & browsing may prevent blue oak regeneration.

There are no observable signs that blue oak regeneration has been occurring in the absence of grazing for 11 years. Deer browsing has been

severe and protective barriers are needed for sapling oaks for this reason alone. Since cattle are likely to be on the tabletop in the autumn, exclosures around young oaks will be advisable to protect them from both cattle and deer.

6) Cattle wastes have a negative aesthetic impact.

This is a trivial potential impact when compared with benefits to the ecosystem.

7) Cattle presence may interfere with other public uses.

Cattle will be removed by March 15, in advance of public wildflower hikes that begin in late March and continue through mid-April.

Summary: Most potential negative effects of grazing involve a range of severity. At low levels, negative grazing effects are very temporary and benefits for native species in low elevation California grasslands are relatively large. The cost to the ecosystem of allowing exotic grasses to overwhelm native species in the competition for light, water, space and nutrients is a continuing decline in native species diversity in a basalt-flow associated grassland type that has a very limited statewide distribution and is noteworthy for the diversity and abundance of native forb species that could be sustained here under favorable management.

Prescribed Fire

Although little is known about fire's historic interval in California's native grasslands, there is a general consensus among grassland ecologists that fire has played an important role in the evolution of this community. Historic, seasonal fires, igniting during the late summer and fall months during lightning storms, spread extensively before rainfall or natural barriers put them out. In addition, historical anecdotes report that Native Americans routinely used fire to reduce dense brush cover and improve forage for deer herds.

In contrast to natural and Native American burns that occurred in late summer and fall, most prescribed fire in grasslands is targeted to late spring, when exotic grasses still retain the annual seed production in the inflorescence. At this time, exotic thistles also have not released their seeds. When a burn occurs at this phenological stage, exotic grasses and thistles can be much reduced in the next growing season (Pollak and Kan 1996). And native forbs, both annuals and perennials, usually respond dramatically with brilliant blooming carpets consisting of many thousand individual plants.

A natural lightening-strike fire occurred on neighboring McKenzie Table in 1994. A Sierra Foothills Conservancy volunteer conducted a detailed

study of the fire effects which are included in Appendix I.

Potential positive impacts of prescribed fire:

1) Removal of mulch layer and release of nutrients into the soil.

2) A late spring burn could dramatically limit exotic grass seed and exotic thistle seed, while the earlier maturing native forb seed may escape the fire in cooler sites on the ground.

3) Native plant species usually increase their numbers greatly in the first year after a fire (R. Hanson, 1986; Parsons & Stohlgren, 1988).

4) Except where fire fighting equipment is used, any soil compaction effects are avoided. In general, all the potential negative effects of grazing (compaction, water quality issues) are avoided.

Potential negative impacts of prescribed fire:

1) Prescribed fires sometimes escape. There is a liability risk.

2) Fire control agencies do not always honor requests that are intended to protect the habitats present. Specifically, requests to not use bulldozers or requests to not do air drops of fire-retarding fertilizer. Bulldozer impacts are permanent. The fire retardant exacerbates the problem of dominating exotic plant species in the grassland.

3) There is a concern, that burning on the table top before the 6" thick mulch layer is removed by cattle will produce a fire that is very hot and quite possibly would have negative effects on many grassland organisms.

4) Late spring burn effects on wildlife are largely unknown. The vulnerability of invertebrates, nesting birds, and other wildlife should be a major consideration. But, the published literature on late spring burns neglects this issue.

Natural burns occur at a time of year when wildlife is least vulnerable. Reproductive cycles have generally been completed by this time and young are either mobile or sequestered underground as eggs. Unfortunately, now that control of exotic plant species is a primary need, prescribed burning in late summer or fall no longer is advisable, because the grass seed and thistle seed will already be on the ground where too much of it would escape the burn. A fall burn would in fact provide an opening for exotics to spread, unless followed up with a broadscale application of pre-emergent herbicide, such as Transline, that is effective against thistles. Although this may be an effective way to control thistle populations elsewhere, it would be counterproductive on the tabletop. Here the goal is to increase and expand populations of native annual

forbs, many of which are in the same family as thistles and therefore would also be killed.

5) Positive effects of burns last only one or two years (R. Hansen, 1986; Parsons and Stohlgren, 1989) so repeated burns requiring a great commitment of staff time and dollars are needed to maintain benefits when burning is the only management tool.

6) There is evidence that repeated spring burns for 3 years or more cause native plant species to decline. (ref)

7) Burns may kill young oaks and damage mature oaks. This risk is increased when fuel loads are high as they are at present. Increased herbivory by rodents is another effect of fire that may be caused by the sudden decrease in food sources other than oaks (J. Schwan et al, 1997).

8) Fire stimulates the growth of exotic forbs as well as native forbs (R. Hanson, 1986; Parsons and Stohlgren, 1989).

9) Administrative barriers to prescribed burning are such that many hours of staff time may go into planning and implementing a burn without any assurance that the burn will be allowed to occur.

10) Release of CO2 and other pollutants into the San Joaquin Valley air basin.

Summary: Prescribed burning may be a practical and beneficial management tool to use in combination with grazing on Big Table. A pilot project could be developed to provide answers to questions regarding late spring burn effects. Building on those results, a plan could be developed that will integrate prescribed fire and grazing in the future management of Big Table Mountain.

Rest: Positive and Negative Impacts

Rest is the management "action" that often slips by unexamined. However, as can be easily seen by very casual observations on Big Table, there are definite consequences that flow from having no grazers on this particular California annual grassland for a number of years. At the casual level of observation, one can't help but notice that the grassland is difficult to walk through, because one is obliged to "plow" through not only the 6 inch mulch layer, but also the standing grasses, prickly lettuce, and tarweed that are well above knee-high. Indeed, in such areas (all the deeper soil areas on the tabletop) the light of day does not reach the soil surface, where any native forb that requires unmuffled diurnal temperature and light fluctuations to germinate will not have the impetus to venture

outside its seed coat. Quite possibly the tendrils of ubiquitous decomposer fungi have ventured inside many of those seed coats sometime in the last 11 years of ever-increasing mulch.

Heavy mulch promotes soft chess brome (the most abundant non-native annual grass on the tabletop) and suppresses goldfields (Lasthenia californica) (R.H.Heady, 1956). The field trial data collected over 5 years with variable rainfall on Big Table and Kennedy Table is congruent with this much earlier finding, by researchers at UC Hopland Research Station. Additional correlations can be made from the field trial data and these are presented in Appendix F. In general, some native forbs are more strongly correlated with open ground than others. Goldfields, yellow carpet, and tidy-tips have the strongest correlation with very little mulch. Other native forbs, such as meadowfoam, and checkerbloom correlate with a moderate amount of mulch. No native forb is more abundant in heavy mulch than with lesser mulch thickness.

Potential Positive impacts of Rest

1) Assuming a year of adequate rainfall, when a grassland is rested after a series of years of heavy grazing, native plant species are afforded both good conditions for germination and seed production in the same year. Thus, soil seedbanks will be restocked in that year. Native forbs bloomed abundantly in the first year following the WCB purchase of Big Table and the cessation of grazing (pers.comm., C. Peck).

2) Soils compacted by livestock trampling become less-compacted through physical and biological processes. Freezing and thawing is probably not a major mechanism on Big Table Mountain, but even repeated wetting and drying of soil particles over time will tend to reverse compaction. Biological action, such as activities of ants and other burrowing invertebrates, burrowing rodents, and the growth and decomposition of annual plant roots will also decompress soil.

3) Rest may allow blue oaks to be recruited from seedling to sapling stages.

Blue oak regeneration occurred between 1850 and 1930 in California, when grazing pressure was often severe, but less consistent than from 1930 to present. In other words, pulses of regeneration may have occurred during the earlier period, when livestock herds were temporarily decimated by disease or drought (Swiecki & Bernhardt, 1998).

If more consistent livestock grazing were the only difference between the pre-1930 period and recent conditions, there should be a pulse of blue oak regeneration occurring on the tabletop and slopes of Big Table Mountain now. Unfortunately, this does not appear to be happening on the tabletop

even after 11 years of rest. Signs of recent deer browse are quite evident. Herbivory by rodents and insects could also be playing a role in the lack of regeneration. Lack of blue oak regeneration even in the absence of livestock grazing has been noted by researchers (J. Tecklin, D. McCreary) in other locations.

4) Vernal pool basins marked by livestock hoof prints become smooth again.

This has occurred on Big Table. By all accounts, Big Table was heavily grazed in the years preceding the WCB purchase in 1993. Residual Dry Matter (RDM) often dropped below 800 lbs per acre that is the minimum standard in the current Grazing Plan (Appendix G). And the pools were trampled with little vegetative cover remaining. After six years of no grazing[13] there were no signs of cattle trampling left in the pool basins. The hoof prints may have disappeared in much less than 6 years.

Although many people prefer vernal pools with no hoof prints, the ecological superiority of this condition is not clearly established. As previously noted (Potential Positive Impacts of Grazing) native graminoids are more abundant in vernal pools where there are hoof prints[14].

5) Perennial members of the lily family have a chance to reproduce from seed during rest from grazing.

The proposed grazing plan calls for removing cattle by March 15. This should allow for many perennial members of the lily family to produce seed[15].

6) During rest from grazing, native perennial grasses have a chance to establish new recruits.

After 11 years without grazing, there is no evidence that native perennial grasses have expanded their range on the tabletop.

---

[13] The writer's first site visit to the pools on Big Table occurred at that time.

[14] This group of native species does not differentiate between the hoof prints of domestic or wild ungulates. Native graminoid species were found growing in deer hoof prints in a vernal swale on the un-grazed half of the tabletop in 2004. In fact, that's the only place they could be found on that transect.

[15] In the absence of cattle, lilies are grazed by deer. On the un-grazed end of the tabletop, lilies are often mowed at 4'' above the ground amid many distinct deer hoof prints.

There are almost no native perennial grasses on the tabletop, except in the rocky outcrops where they are common, but sparsely distributed and occasionally in some of the cracks in the basalt. The cracks are sometimes like long planter boxes with deep soil surrounded by a large area of very thin soil. Non-native grasses do not do well in the thin soils and therefore have not been showering this native perennial grass stronghold with an over-abundance of their seed. Native perennial grasses may have also been relatively protected here from cattle who typically avoid unsteady footing.

Although there are widely scattered native perennial bunchgrasses in thin soil areas, they clearly are more robust when they have access to deeper soil such as in the basalt cracks. This configuration suggests that the native perennial grass species on the tabletop may not have sufficient rooting depth to thrive in thin soils. The deeper soils could provide the most suitable conditions for expansion of perennial grasses, but these areas currently have cover values for live vegetation as high as 100% non-native grass. Mulch in these areas is typically 75% of the ground cover and ranges from 4" to 7" thick. These conditions are very unlike the native perennial bunchgrass prairie for which California native perennial grasses are adapted. Restoration plantings will be necessary to expand the range of native perennial grasses on the tabletop.

Negative Impacts of Rest

1) Non-native grasses are allowed to exert their competitive advantages with no opposing influence. Consequently, the annual grassland is degraded even further.

2) One year of rest during a dry cycle for example, is a very different scenario than a policy of no grazing. No grazing in the annual grassland for 3 years and more is potentially damaging. We do not really know how long the native forb seeds remain viable in soil seed banks. A literature search yielded no clear results for the native species in question. However, research indicates that seed viability varies greatly among plant groups. Non-native grass seed does not remain viable from one year to the next. Legume seed is viable for more than one year and constituted 82% of seeds that had retained viability over winter in a local grassland (San Joaquin Experimental Range). But, the native forb species of interest were included in a category termed "miscellaneous forbs". These seeds lost 55% of their viability by the second growing season (Young, Larson et al 1981).

3) Rest allows the accumulation of excessive mulch and standing senescent plant material. This creates a structural condition that degrades grassland habitats for bird species (horned lark, prairie falcon, other raptors, and western bluebirds), increases populations of meadow

mice (a factor in suppressing germination of blue oaks), suppresses the germination of many native forbs, and both reduces food sources and blocks access to burrowing sites for ground-nesting native bees. This single unambiguous result of rest affects the function and diversity of the entire grassland ecosystem, from primary producers up to the top predators.

Internal & External Management Constraints

There is a geographic constraint on cattle access to the tabletop. The only feasible way to bring cattle to the site is to drive them from Smith Basin up the southern slope. Smith Basin is within the McKenzie Preserve which is owned and managed by the Sierra Foothills Conservancy (SFC). DFG would like to work through SFC as a sole source contractor to manage the grazing and upkeep of fencing and the water supply.

Monitoring tasks during the field trial (2000 – 2004) have required approximately 3 weeks in the field for 2 – 3 people. Data processing and analysis for preparation of presentations and reports has required roughly 3 months of Associate Biologist time and 2 weeks of Scientific Aid time. Considering the high value of the site and the management issues and consequences involved, this expenditure of personnel time is justified. However, Conservation Planning in Region 4 does not have sufficient temporary personnel and Associate Biologists to cover this need and the needs of other Ecological Reserve's on an ongoing basis.

Biological Element 2. Habitats on the slopes of Big Table Mountain:

2a) Cliffs and talus slopes and associated special status species

- Prairie falcon - CSC
- Golden eagle – DFG-FP
- Western mastiff bat - CSC
- Spotted bat - CSC

2b) Other vegetation associations on the slopes of Big Table Mountain and any associated special status species.

Blue oak, live oak, and foothill pine and chaparral associations

Special status species

- Valley elderberry longhorn beetle - FT
- Perideridia spp nova (a new species with very limited distribution)
- Mountain lion – DFG-FP
- Noxious weeds and feral animals

Biological Goal 2: Protect native diversity and abundance in habitats on the slopes of Big Table Mountain and associated special status species. These habitats include blue oak, live oak, and foothill pine and chaparral associations dominated by manzanita and ceonothus. Sheer cliffs and talus slopes composed of basalt and granite exfoliated material occur at the edges of the tabletop.

Task (2.1) Resource Assessment Program personnel will do vegetation mapping on the slopes.

Task (2.2) Maintain current management practices excluding rock climbing and hang-gliding.

Task (2.3) Minimize damage to habitats from feral pigs. If significant damage is found during vegetation mapping, the Region may remove the pigs or offer a supervised public hunt.

Task (2.4) Assess status of mastiff bat and spotted bat resident populations. Repeat monitoring every three years to develop trend data.

Task (2.5) Maintain centralized records for sensitive bat species, prairie falcon, and bald eagle observations.

Task (2.6) Survey for Valley elderberry longhorn beetle and host shrub, Sambucus mexicana. Assess habitat quality and regeneration issues.

Task (2.7) GPS locations of Perideridia spp. Nova on DFG property. Send necessary vouchers to recognized taxonomist for naming and description. Assess habitat status and any management needs.

Task (2.8) GPS any noxious weed infestations on the slopes and implement appropriate control methods. Avoidance of negative impacts to native species will have priority.

Potential Impacts (Goal 2):

Management actions required to achieve Biological Goal 2 will include biological surveys and GPS mapping, limiting recreational access to permitted activities only, and possibly the judicious use of herbicide. These are exempt projects under CEQA, Class 7, as actions undertaken by regulatory agencies "…to assure the maintenance, restoration, or enhancement of a natural resource…." Any necessary monitoring also falls under this category.

Internal & External Management Constraints

To date, DFG personnel time has been focused exclusively on tabletop habitats. The slopes within DFG property boundaries total more than 50% of the total acreage and have received almost no attention from managers, because of limited staff.

C. Public Use Elements: Goals and Environmental Impacts

Big Table Mountain is geographically inaccessible for casual public use. The basalt flow vernal wetland habitat and its associated sensitive species are vulnerable to a variety of recreational impacts. Consequently, DFG's public use policy has been to conduct a limited number of organized tours each spring for the public. DPR also typically conducts several interpretive tours that are coordinated with DFG. Limiting access to these organized events is recommended to maintain sensitive habitats on the property in good condition.

Public Use Element: Environmental Education

- site interpretive program
- research & educational projects of local colleges

Goal: Support beneficial low impact use of the vernal pools for educational purposes for all age groups. Guided tours by DPR or DFG personnel are preferable to self-guided tours in order to reduce disturbance to the many sensitive plants and animals. This is especially important during the spring, when the Big Table Mountain flora and fauna are most susceptible to disturbance.

Task 1.1) Continue offering wildflower interpretive hikes with partner San Joaquin River Parkway and Conservation Trust. These shall also be coordinated with DPR.

Task 1.2) Post signs to prevent public from using portable toilet for trash receptacle. If considered advisable, post signs informing public of mountain lion safety precautions.

Task 1.3) Provide interpretive materials at the Millerton State Park Recreation Area Headquarters, for those unable to negotiate the rugged terrain. Interpretive materials could include educational brochures and handouts, videos, or CD-ROM's, discussing the ecology and importance of vernal pools, grasslands, and blue oak woodland communities.

Task 1.4) Establish communication with college instructor(s) who conduct projects. Determine the nature of their activities and explain Scientific research permitting process. Work towards establishing open communication and obtaining results of their work conducted on DFG property.

Environmental Impacts

No tasks identified under Public Use Elements are expected to have any significant impacts to sensitive habitats or species.

D. Facility Maintenance Elements: Goals and Environmental Impacts

Facility Maintenance Elements: Fencelines, access road, restroom

Goal: Maintain all infrastructure in a functional and safe condition.

Task 1.1) With partner, Sierra Foothills Conservancy, perform fenceline maintenance tasks as needed.

Task 1.2 Maintain unpaved access road to the tabletop.

The MOU established between the DFG and the DPR requires that DPR maintain the road in good driving condition. This is done on an as needed basis by the DPR. The road is unpaved, very steep, and subject to severe erosion during winter storms. A high level of public use is inadvisable.

Task 1.3) Comply with ADA accessibility criteria. Replace portable toilet

with one designed to meet minimum ADA standards.

The Department of Parks and Recreation and the California Department of Fish and Game are required to comply with ADA standards. Although Big Table is not designated an Ecological Reserve, due to the unique and sensitive nature of blue oak communities and vernal pools, they are managed in a similar manner. As such, disturbance not meant to improve habitat is kept to a minimum. Driving past the staging area is not permitted except under extenuating circumstances, such as fire control or habitat improvement. The existing foot trail is to remain unimproved in order to maintain the wild character of the landscape, as well as to protect nearby vernal pools from erosion or overuse.

Environmental Impacts

No tasks identified under Facility Maintenance Elements are expected to have any significant negative impacts to sensitive habitats or species.

V. OPERATIONS AND MAINTENANCE SUMMARY

A. Operations and Maintenance Tasks and Existing Personnel Needs to Implement Plan

The O & M table follows on the next page.

VI. REFERENCES

Barbour, M.G., Burke, J.H., Pitts, W.D. 1987. Terrestrial Plant Ecology, second edition. The Benjamin/Cummings Publishing Company, Inc. Menlo Park, CA. 634 pp.

Barbour, M.G., A. Solomishch, C. Witham, R. Holland, R. Macdonald, S. Cilliers, J. Molina, J. Buck, and J. Hillman. Vernal Pool Vegetation of California: Variation Within Pools. Madrono, v 50, n.3, July-September 2003.

Barry, Sheila. Vernal Pools on California's Annual Grasslands. Rangelands. Oct. 1995. Vol. 17: 5. P. 173-175.

Bartolme, James W. 1979. Germination and Seedling Establishment in California annual Grassland. Journal of Ecology 67: 273-281.

Beason, R. C. 1995. Horned lark (Eremophila alpestris). In The birds of North America, No. 195 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C. 23 pp.

Bernhardt, Elizabeth A. and T.J. Deirvki. 1997. Effects of Cultural Inputs on Survival and Growth of Direct Seeded and Naturally Occurring Valley Oak Seedlings on Hardwood Rangeland. USDA general Technical Report PSW-GTR-160.

California Department of Fish and Game. 1992. Memorandum of understanding between State Department of Parks and Recreation and State Wildlife Conservation Board. Sacramento, 3 pp.

California Department of Fish and Game. 2001. Internal document. DFG Real property inventory. Comprehensive parcel list (by name). San Joaquin Valley and Southern Sierra Region, Fresno, _1_pp.

California Department of Fish and Game.. 2002a. California Wildlife Habitat Relationships. Version 8.0 personal computer program. Sacramento, CA.

California Department of Fish and Game. 2002b. Internal DFG document. Preliminary grazing study results. San Joaquin Valley and

Southern Sierra Region, Fresno, 2 pp.

California Natural Diversity Database. 2002. California Department of Fish and Game, Natural Heritage Division, Sacramento.

California Partners in Flight. 2002. Version 2.0. The oak woodland bird conservation plan: a strategy for protecting and managing oak woodland habitats and associated birds in California (s. Zack, lead author). Point Reyes Bird Observatory, Stinson Beach, CA. http://www.prbo.org/calpif/plans.html.

Carrithers, V.F. 1997. Using Transline® herbicide to control invasive Plants. Californoia Exotic Pest Council 1997 Symposium proceedings. 5 pp. Fix this – check how to cite internet resources

Crampton, Beecher. 1959. "The Grass Genera Orcuttia and Neostapfia: a Study in Habitat and Morphological specialization." Madrono 15:97-110.

Crampton, Beecher. 1976. Rare Grasses in a Vanishing Habitat, Fremontia 4(3):22-23.

D'Antonio, Carla, et. al. Ecology and Restoration of California Grasslands with Special Emphasis on the Influence of Fire and Grazing on Native Grassland Species.

Durgarian, A. 2001. Special Status Invertebrate WET Survey. Ninety-day Report. Survey for vernal pool branchiopods at Big Table Mountain in Fresno County, California. Environmental Consultant. Bishop, California. 29pp.

Endangered Species Recovery Program, California State University, Stanislaus. Effects of Livestock Grazing on a Community of Species at Risk of Extinction in the San Joaquin Valley, California. 2003 Annual Report. 30pp.

Eriksen, C., and D. Belk. 1999. Fairy Shrimps of California's puddles, pools, and playas. Mad river Press, Inc. Eureka, California. 196 pp.

Evans, Raymond A. and James A. Young. 1970. Plant Litter and Establishment of Alien Annual Weed Species in Rangeland Communities. Weed Science, 18(6) p. 697- 703.

Evans, Raymond A. and James A. Young. 1970. Invasion of Medusahead into the Great Basin. Weed Science, 18(1) p. 89-97.

Fehmi, Jeffrey D., K.J.Rice, E.A. Laca. 2004. Radial Dispersion of Neighbors and the Small-scale Competitive Impact of Two Annual Grasses on a Native Perennial Grass. Restoration Ecology, 12(1), p. 63-

69.

Frost, William E., 1997. “Range and Livestock Relations” in Proceedings of a Symposium on Oak Woodlands: Ecology, Management, and Urban Interface Issues. USDA general technical report, PSW-GTR-160, p299.

Griggs, Thomas F. Life Histories of Vernal Pool Annual Grasses. Fremontia. 1981. Vol. 9: 1. p. 14-17.

Griggs, Thomas F. Vina Plains Preserve: Eighteen Years of Adaptive Management. Fremontia. Jan. 2000. Vol. 27: 4 and Vol. 28(1): 48-51.

Griggs, Thomas F. 2002. A Comprehensive Management Plan for the James K. Herbert Wetland Prairie Preserve, Tulare County, California. Prepared for The Sierra Los Tulares Land Trust. Unpublished report.

Halstead, Jeffrey A. and R.D. Haines. 1992. New Distributional Records for some Candidate Species of *Lytta* in California (Coleoptera: Meloidae). Pan-Pacific Entomologist 68(1): 68-69.

Hansen, Robert B., 1986. The Effect of Fire and Fire Frequency on Grassland Species Composition in California’s Tulare Basin, 133 pp. Unpublished thesis, California State University, Fresno.

Heady, Harold F., 1965. Changes in a California Annual Plant Community Induced by Manipulation of Natural Mulch. Ecology, v.37, no.4:798-812.

Heady, Harold F., 1977. Valley Grassland, in Terrestrial Vegetation of California, M.G. Barbour and J. Major, Eds., University of California, Davis, California Native Plant Society.

Hobbs, R.J., and L.F. Huenneke. 1992. Disturbance, diversity, and invasion: implications for conservation. Conservation Biology. 6:324-327

Hoehne, Volker M. 1994. Wild Pigs in Santa Cruz County. Fremontia 22(2): 18-19.

Jensen, Henricus C., et al. 1997. Effects of Livestock Grazing on Blue Oak Saplings. USDA general technical report PSW-GTR-160.

Kalisz, Susan. 1991. Experimental Determination of Seed Bank Age Structure in the Winter Annual *Collinsia verna*. Ecology 72(2) p. 575-585.

Kaufman, K. 1996. Lives of North American birds. Houghton Mifflin Company. Boston. 675 pp.

Keeley, Jon E. and C.J. Fotheringham. Species – area relationships in Mediterranean climate plant communities. Journal of Biogeography.

Nov. 2003. Vol. 30:11.

King, J. 1996. The evolution of diversity in ephemeral pool crustaceans: from genes to communities. PhD dissertation, University of California, Davis. 207 pp.

Kroeber, A.L. 1976. Handbook of the Indians of California. Dover Publications, Inc. New York, NY. 995 pp.

Luces, B., and E. Pierson. 1998. Ecology, Conservation and Management of Western Bat Species. Bat Species Accounts. Western Bat working Group Workshop. Reno, Nevada, February 9-13, 1998.

Mallory, Richard M. 1955. A Floral Profile of Big Table Mountain. Unpublished report.

Marty, Jamie

McCreary, Douglas D. 1997. Treeshelters: An Alternative for Oak Regeneration. Fremontia 25(1): 26-30.

Menke, John W. Grazing and Fire Management for Native Perennial Grass Restoration in California Grasslands. Fremontia. April 1992. Vol. 20: 2. p. 22-25.

Moriuchi, Ken S., D.L. Venable, C.E. Pake, T.Lange. 2000. Direct Measurement of the Seed Bank Age Structure of a Sonoran Desert Annual Plant. Ecology 8(4) 1133-1138.

Pavlik, Bruce M., P.C. Muick, S. Johnson, and M. Popper, 1991. Oaks of California. Cachuma Press and California Oaks Foundation. 184 pp.

Pollak, Oren and T. Kan. 1996. The Use of Prescribed Fire to Control Invasive Exotic Weeds and Jepson Prairie Preserve. In, Ecology, Conservation, and management of Vernal Pool Ecosystems, Proceedings from a 1996 Conference. Carol W. Witham et al Eds. California Native Plant Society, 284 pp.

Poole, C. Table Mountain tells a story. The Foothill Advocate. Summer, 1997. Vol. 1, No. 4.

Raven, Peter H. and D. I. Axelrod. 1995. Origin and Relationships of the California Flora. California Native Plant Society. 134 pp.

Schwan, Joan, J. Fong, H.K. Hug. 1997. Wildfire and Oak Regeneration at the Urban Fringe. USDA Forest Service General Technical Report PSW-GTR-160.

Selander, R. B. 1960. Bionomics, Systematics, and Phylogeny of Lytta, a Genus of Blister Beetles (Coleoptera: Meloidae). Illinois Biological Monographs: Number 28. 295 pp.

Smith, D.W., and W.L. Verrill. 1998. Vernal pool-soil-landform relationships in the Central Valley, California. Pages 15-23 in: C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (Editors). Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, CA. , 285 pp.

Smookler, Robert H., 1977. A Comparative Study of the Vascular Plants of Three Vernal Pools in the San Joaquin Valley, California. Masters Thesis, 54 pp. University of the Pacific, Stockton, CA.

Steenhoff, K. 1998. Prairie falcon (Falco mexicanus). In The Birds of North America, No. 346 (A. Poole and F. Gill, eds.).The Birds of North America, Inc., Philadelphia, PA. 27 pp.

Swiecki, Tedmund J. and E. Bernhardt. 1998. Understanding Blue Oak Regeneration. Fremontia 26(1): 19-26.

Thorp, Robbin W. and J.M. Leong. 1995. Native Bee Pollinators of Vernal Pool Plants. Fremontia 23(2): 3-7.

Tibor, D. P. 2001. California Native Plant Society's Inventory of Rare and

Endangered Plants of California. Sixth edition. California Native Plant Society, Sacramento, , 387 pp.

U.S. Fish and Wildlife Service. 1984. Valley Elderberry Longhorn Beetle Recovery Plan.Region 1, Portland, Oregon. 62 pp.

Vollmar, J.E. 2002. Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting, Berkeley, California. 446 p.

White, R.E. 1983. A field guide to the beetles of North America. Houghton Mifflin Company. Boston, __pp.

Young, J.A., Evans, R. A., Raguse, C.A., and Larson, J. R. Germinable Seeds and Periodicity of Germination in Annual Grasslands. Hilgardia, Vol. 49, No. 2, February, 1981.

Personal Communications:

Dennis Haines, Botanist-Entomoligist, California Department of Agriculture, Tulare County.

Jeannine Koshear, Ecologist, Department of Parks and Recreation, Millerton State Park Recreation Area.

Jeanne R. Larson, Botanist & Range Scientist, retired from the Forest Service and active many years in Fresno chapter of the California Native Plant Society

Howard Latimer, Emeritus Professor of Botany, California State University, Fresno.

Chuck Peck, Sierra Foothill Conservancy

Rhonda Reed, Conservation Planning Supervisor, 1997-98, California Department of Fish and Game, Region 4.

Jeffrey R. Single, Conservation Planning Supervisor, 1999-2001, California Department of Fish and Game, Region 4.

Scott Wassman, Supervisor, San Joaquin District, Department of Parks and Recreation.

VII. APPENDICES